JETI model

Central Box

Protected multi-channel servo interface

EN *User Manual*

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Central Box 100

Central Box 200

1 Introduction

ENGLISH

The Central Box is a switchboard designed for the complete management of servos in a model with an emphasis on safety. The Central Box has a unique design that provides overload protection at each servo output. The Central Box can manage two batteries and fully supports the JETI EX telemetry system. Up to two receivers with serial (PPM, EX Bus) output can be connected to the Central Box. With JETI DC/DS transmitter, the full potential of the Central Box can be used, such as an easy way to configure the Central Box, EX telemetry, and very fast servo response.

1.1 Attributes

- Overload protection on each channel
- Possibility to connect up to 2 receivers with serial interface (PPM, EX Bus)
- Built-in Expander function for up to 3 sensors
- Input for magnetic switch or RC switch (Central Box 200 only)
- MPX battery input connector(s):
  1x Central Box 100, 2x Central Box 200
- 100Hz mode of servo outputs (10ms period)
- Supports EX telemetry (voltage, current, capacity, and temperature measurement, overload indication, ...)
- Easy settings changes via DC/DS transmitter
- Firmware updates by user
- Suitable for use with high voltage (HV) servos
- Compact size for easy installation
- Each output is individually configurable (channel assignment, trim, reverse, ATV)

2 Description

2.1 Central Box 200

Central Box 200 has 15 outputs for servos with overload protection.
Channels 14 and **15** are configurable as:

- servo output
- an input for telemetry sensor

Ext1 port can be configured for use as:

- an output to connect a JETIBOX or Duplex EX receiver to either configure the Central Box or for the output of telemetry data
- an input for telemetry sensors

The Ext1 slot is also used for the firmware update connection (using the USBa).

Rx1 - primary input for connecting receivers with serial output (EX bus or PPM)

Rx2 - secondary (backup) input for connecting receivers with serial output (EX bus or PPM)

Switch input is reserved for connecting a magnetic switch or RC switch (optional accessories).

BATT1 and **BATT2** – MPX connectors for connecting batteries or a BEC, etc., to power the servos and receivers connected to the Central Box.

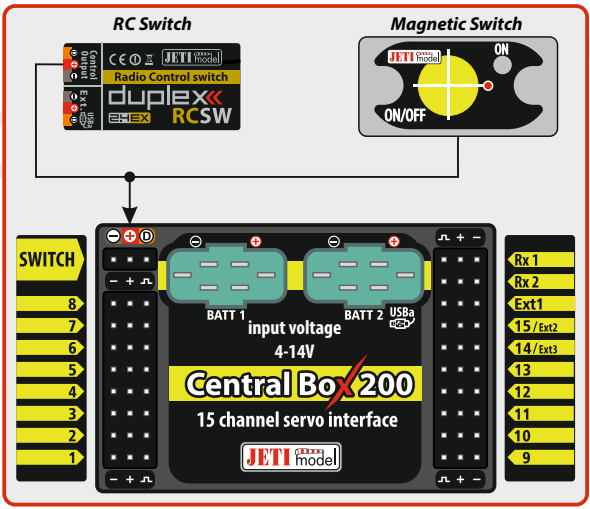

Fig. 1: Central Box description

2.2 Central Box 100

The ***Central Box 100*** has **8 servo outputs** with overload protection, labeled 1 through 8.
OUT/IN – universal input/output for switching additional functions or for supervising the operational status
Ext1 – this port can be configured for use as:

- an output to connect a JETIBOX or Duplex EX receiver to either configure the Central Box or for the output of telemetry data
- an input for telemetry sensors

The Ext1 slot is also used for the firmware update connection (using the USBa).

Rx1 - primary input for connecting receivers with serial output (EX bus or PPM)
Rx2 - secondary (backup) input for connecting receivers with serial output (EX bus or PPM)
BATT1 – **MPX** connector for connecting batteries or a BEC, etc., to power the servos and receivers connected to the Central Box.

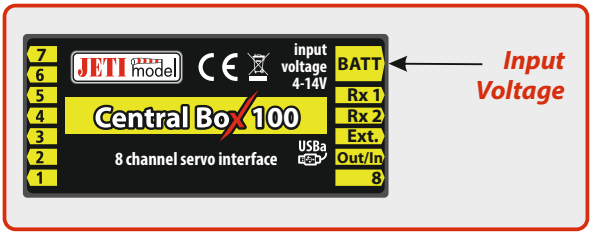

Fig. 2: Central Box 100 description

2.3 Magnetic switch (Central Box 200 only)

The magnetic switch is used to turn the Central Box 200 on or off and is connected to a separate slot labeled "Switch". To turn on the Central Box using the magnetic switch it is necessary to hold the supplied magnet carrier (key) to the target so that the carrier (key) and the target on the magnetic switch are properly oriented (align the dots).

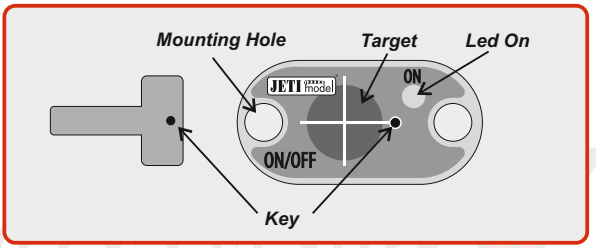

Fig. 3: Description of magnetic switch and the key

Green LED
- flashing LED signals proper detection of the magnet key
- steady LED signals "On" state

When the magnet key is held to the target in the proper orientation, the green LED glow steadily after 1 second indicating that the electronic switch is turned on.
Switching off is done in a similar manner, when the magnet key is held to the target in the proper orientation, after 1 second, the green LED goes off and the system switches off.
If the switch is not plugged in the Central Box, the Central Box is switched on.
The system remembers whether it has been switched on or off. If the system is switched "on" via the magnetic switch and then the power supply is disconnected, when the batteries are re-connected to the system automatically returns to the "on" state. For safety reasons, always switch the system off via magnetic switch before disconnecting the power batteries.

When turning on, connect the batteries first and then turn the system on via magnetic switch. Keep the same rule when switching off. First switch the system off via magnetic switch and then disconnect the batteries.

3 Connection

The Central Box is connected to the power supply, receiver, servos, controller/controllers and eventually sensors. Please follow the subsequent general guidelines about proper connection of the Central Box and these other components.

3.1 Power Supply

The Central Box can be powered from batteries which are directly connected, from voltage regulators connected to batteries or via BEC. When selecting power sources for the Central Box, be sure to follow the minimum power requirements. Together, both power supplies methods must be able to supply a 15A continuous and 90A peak current. If the power source is not strong enough, the overload protection feature of the Central Box may not function correctly.
The power batteries are connected to the Central Box using MPX connectors. The Central Box allows up to two batteries to be connected. During use, the power is actually supplied from the battery with the higher voltage. If the voltage is the same, the power can be used from both batteries at the same time. When the voltage of the batteries is different, the power is not shared and each pack is isolated from each other. This allows you to use batteries of different capacity, number of cells, and chemistry type. If the power for the Central Box is provided only from one battery, it can be connected via BATT1 or BATT2 input.

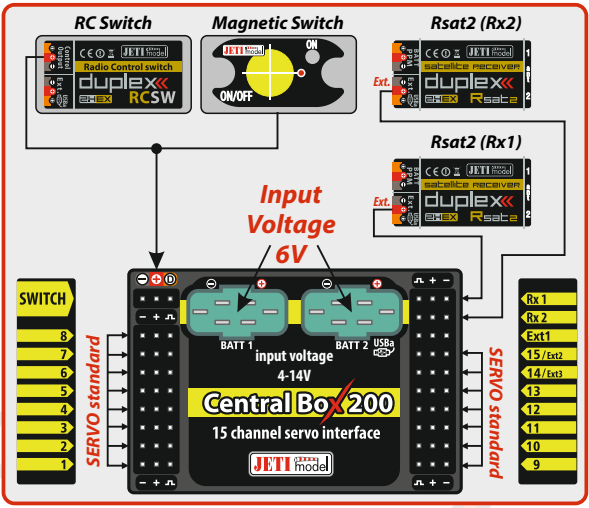

Fig. 4: Example of the Central Box 200 powered for use with standard servos (voltage range up to 6V)

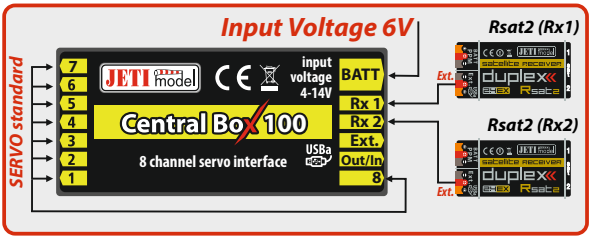

Fig. 5: Example of the Central Box 100 powered for use with standard servos (voltage up to 6V)

Central Box does not contain circuitry to stabilize or regulate voltage to the servos.

The level of the input voltage is equal to the level of (output) supply voltage level to the servos. Be sure to match the proper type of servos with your selected power supply. Eg. when using 2 Li-xx cells without a regulator, it is necessary to use servos labeled "High Voltage".

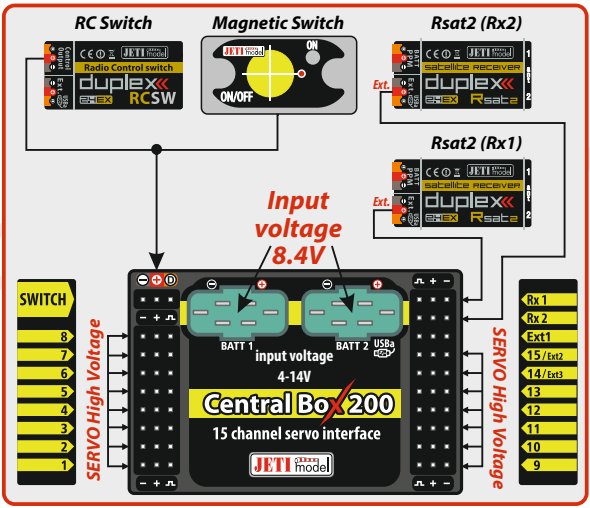

Fig. 6: Example of the Central Box 200 powered for use with HIGH Voltage servos

Caution: It is not recommended to supply power to the Central Box through the outputs for servos, sensors or receivers.

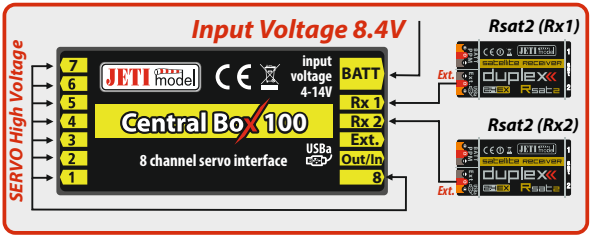

Fig. 7: Example of the Central Box 100 powered for use with HIGH Voltage servos

3.2 Overload protection of servos

The Central Box has an overload protection circuit on every servo output. In case of an overload, the affected servo output is disconnected from the power supply while the remaining servo outputs are still powered.

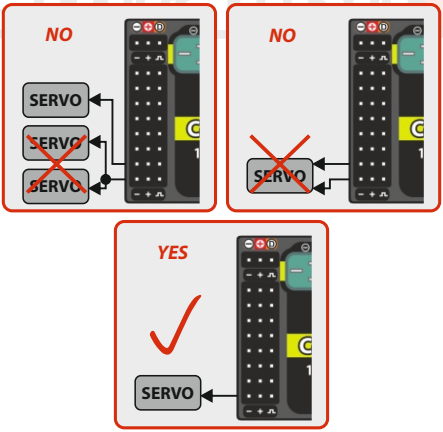

Fig. 8: Correct connection of servos to the Central Box

Caution: ***It is not recommended:***
- ***to connect more Central Box outputs to one servo***
- ***to use a Y cable (connecting two servos to one output)***

3.3 Connecting Central Box – PPM variant

The receivers can be connected to the Central Box using the **Rx1** and **Rx2** inputs.

The **Ext1** port is for output of telemetry data from the Central Box in the form of EX telemetry. To use the Central Box telemetry and other sensors connected to it, use a ***Duplex EX*** receiver. Simply connect the Central Box output labeled **Ext1** with the ***Duplex EX*** receiver input labeled **Ext.**

Channels 14 and **15** can be configured as servo outputs, or as inputs for telemetry sensors *(Central Box 200 only)*.

Configuring the Central Box is in this way done by using a JETIBOX; either directly connected to the Central Box, or wirelessly using a JETI transmitter.

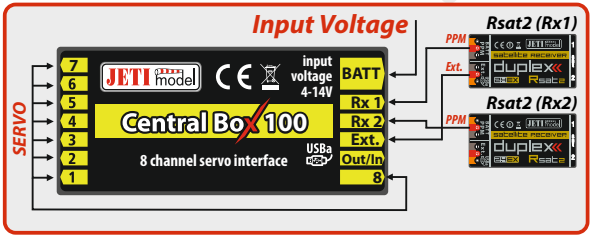

Fig. 9: Block diagram of Central Box 100 connection - PPM variant

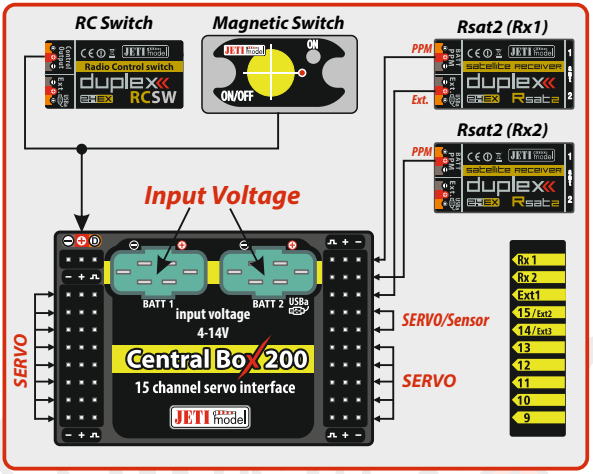

Fig. 10: Block diagram of Central Box 200 connection - PPM variant

3.4 Connecting Central Box – EX Bus variant

Receivers can be connected to the Central Box using the **Rx1** and **Rx2** inputs.

Ext1 is an input for telemetry sensor. Telemetry is transmitted to the receivers via **EX Bus**.

Channels 14 and **15** can be configured as servo outputs or as inputs for connecting telemetry sensors *(Central Box 200 only)*.

Configuring the Central Box is in this case done directly in the transmitter via **EX Bus**.

When operating the **Central Box** with **DC/DS transmitter**, it is recommended to use two receivers communicating with the transmitter in the wireless mode "Double path".

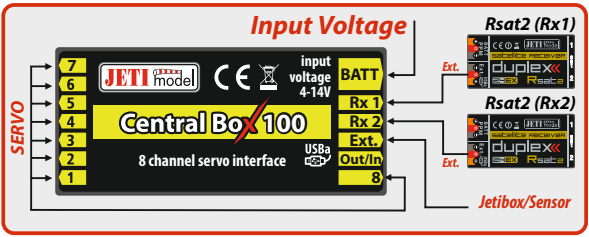

Fig. 11: Block diagram of Central Box 100 connection - EX Bus variant

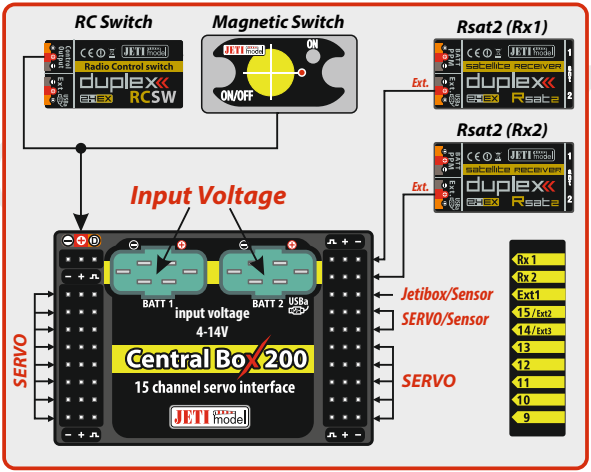

Fig. 12: Block diagram of Central Box 200 connection - EX Bus variant

The Central Box can be configured in two ways:

- by JETIBOX connection (directly to the Central Box or wirelessly via the transmitter)
- by DC/DS transmitter via Device Explorer (EX Bus)

4 Configuration via JETIBOX

The JETIBOX terminal can be used for parameter setting and retrieving data. After connecting to the ***Central Box*** (output Ext1), a startup screen appears that contains identification of the device in the first line of the JETIBOX display. The second line contains the data showing the consumed capacity of **batteries 1** and **2**.
By pushing the R button (to the right) on the JETIBOX, you get to the expander menu.
In the expander menu, the second lines display the sensors that are connected to inputs **Ext1, Ext2/15** and **Ext3/14.**
Using buttons **U** and **D** *(down and up arrows)* of the JETIBOX it is possible to browse through the expander inputs. The selected input is marked with a curly bracket brace after the input number, eg. 1}. By pushing the R button (right arrow) it is possible to enter a selected sensor, where you can adjust and display its parameters.
Return from the sensor menu:
- by holding the **L** button (left arrow) for extended time
- by holding the **L** button (left arrow) for short time, in case you are in the basic menu of the sensor (in the first line there is identification of the sensor and in the second line there are actual data, such as„MUI 30; 14,2V 7,8A")

The input marked 1}… means that there is no device connected to this input or the connected device is not compatible, or the input from the Central Box is not properly configured.
By pushing the D button (down), you get from the initial screen of the Central Box to its menu.

4.1 Actual values

CENTRAL BOX:

Actual Value – by pushing the **D** button (down arrow) you select the display of actual measured values

- ***Accu voltage*** - shows the actual voltage of both inputs
- ***Accu current*** - displays the actual current flowing from the battery to the output
- ***Accu capacity*** – consumed capacity of each battery
- ***Over-I Monitor*** - indication of servo output; (-) output is fine (x) the output is overloaded. Outputs are ordered:

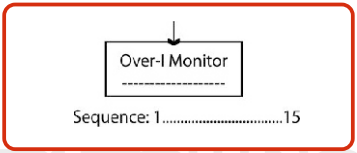

Fig. 13: Description of outputs

- ***Temperature*** – actual temperature of Central Box
- ***Information on the status of receivers*** - number of detected channels and the period of signal

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4.2 Minimum / Maximum values

CENTRAL BOX*: MIN / MAX** – by pushing the **D** button (down arrow) you select a display of extreme voltage, current, temperature, and status of the receiver, which occurred during the operation. Recorded extremes are deleted manually in the Settings menu - ***Erase Data.

- ***Minimal voltage*** – the lowest voltage detected by the Central Box on the inputs during its operations
- ***Maximal voltage*** – the highest voltage detected by the Central Box on the inputs during its operation
- ***Maximal current*** – the highest current detected by the Central Box on the inputs during its operation

• ***Min/Max Temper.*** - the highest and the lowest temperature of the Central Box during its operation (since the last manual reset)

Statistics of the received signal expressed in time
R1: how long was the signal from the primary receiver available to the Central Box
R2: how long was the signal from the secondary receiver available to the Central Box

Statistics of the received signal expressed as a percentage
R1: what percentage of the total operating time was the signal from **the primary receiver available to the Central Box**
R2: what percentage of the total operating time was the signal from the secondary receiver available to the Central Box

• ***Over-I Monitor*** - indication of servo output during the operating time of the Central Box; (-) output is fine (x) the output is overloaded

4.3 Setting

***CENTRAL BOX*: SETTING** – By pushing the **D** button (down arrow) you get to the basic setting of the device.
• ***Fail Safe*** – switches on/off of the Fail Safe function. If the Fail Safe function is deactivated, there is no signal generated in any Central Box outputs at the signal loss. If you activate the Fail Safe function, you can also select how the Central Box responds at the signal loss for each of the individual outputs (OUT off, hold, fail safe).
• ***Signal Fault Delay*** – the length of time from when the Central Box detects a signal loss to when the programmed Fail Safe output is performed. During this time the last servo input is held. After the selected time has elapsed, the Central Box outputs behave according to setting for each specific output.
• ***Output Period*** – setting for the period of the output signals (default Auto-synchronous mode with the transmitter). This parameter significantly affects the behavior of the servos. For analog servos the reaction (response) accelerates and the power

consumption is higher when the values for the output period are lower. This can lead to vibration in some servos if the values are set too low.

- ***Erase data*** – by pushing the arrows **R** and **L** (right and left) together, the minimum and maximum are reset, see "MIN / MAX - Minimum / Maximum".
- ***Shutdown Voltage*** - input voltage level at which the Central Box automatically turns off. If Central Box evaluates the input voltage is lower than the stop level for more than 60 seconds, it automatically turns off.

4.4 Out Pin Set

CENTRAL BOX*: Out Pin Set – pushing the **D** button (down arrow) moves you to basic settings of particular outputs of the Central Box.

- ***Set Output pin*** -selection of the slot that will be used for the following settings. In this menu the output deflection of the selected output is displayed as a percentage. Y1 is the Central Box output labeled 1, Y2 is the Central Box labeled 2, etc.
- ***Function*** – setting of alternative functions of the outputs. This function is available for outputs:

  Central Box 200
  - *Y14 and Y15:* Servo Output function or Telemetry Input.
  - *EXT1:* Telemetry Input function or JETIBOX

  Central Box 100:
  - *EXT1:* Telemetry Input function or JETIBOX
- ***SetInChannel*** – assigns the input channel (marked as Chx) to a specific output (marked as Yx)
- ***Reverse*** – reverses the output direction
- ***Signal Fault*** - setting behavior of the receiver in case of signal loss
  - *hold* - repeats the last valid deflection command before signal loss
  - *out off* – does not generate any signal for servo in case of signal loss
  - *FailSafe* – transition to preset deflection of individual outputs

- ***FS position*** – setup of the selected output deflection in case of signal loss
- ***FS speed*** – setup for how quickly the output transitions to its programmed deflection in case of signal loss
- ***ATV High Limit Yx*** – sets the upper travel (throw) limit of the output
- ***ATV Low Limit Yx*** – sets the lower travel (throw) limit of the output
- ***Output Trim*** – setting the neutral deflection of the receiver output
- ***Output Group*** – setting the output to a selected group of output pulses that will be generated from the receiver at the same time

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4.5 Alarms

***CENTRAL BOX*: Alarms** – pushing the **D** button (down arrow) moves you to the menu for setting the alarms. If the alarm is set to OFF, the alarm is deactivated.

- ***Capacity Alarm*** - level of the capacity taken from the battery at which the alarm will sound
- ***Current Alarm*** - level of current drawn from the battery at which the alarm will sound
- ***Voltage Alarm*** – if the battery voltage drops below this level, the alarm will sound
- ***Short Circuit Alarm*** - Activating/deactivating the alarm for when the outputs are overloaded
- ***Temperature Alarm*** – Activating/deactivating alarms for the Central Box overheating

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4.6 Service information

***CENTRAL BOX*: SERVICE** – pushing the **D** button (down arrow) moves you to the display of the firmware version and the menu for restoring the default settings of the Central Box.

- ***PresetToSetup*** – pushing arrows R and L (right and left) together leads to loading the default settings of the Central Box.
- **CBOXxxx v. xx.xx ID xxxxx:xxxxx** – designation of the product with the firmware version and the serial number (ID)

5 Configuration via the DC/DS transmitter

The Central Box can be configured by a DC/DS transmitter via the Device Explorer menu. It is necessary to follow these rules for configuring the Central Box via transmitter:

- **Receiver firmware version Duplex 3.12** and newer ***(with setting Output mode->EX Bus)***
- The receiver must be connected to the Central Box via EX bus
- **Transmitter firmware version 2.02** and newer + the device profile (CBOX100.bin or CBOX200.bin) recorded in the devices directory on the SD card of the transmitter

When everything is properly connected and configured, the CBOX100 or CBOX200 item appears in the Device Explorer menu. Entering the item moves you to the configuration menu.

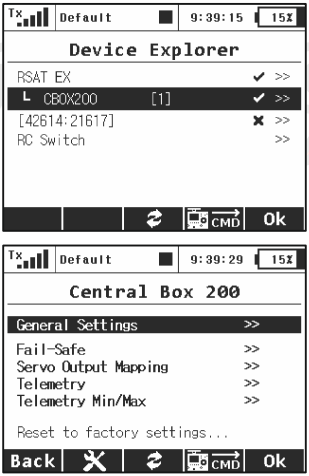


Fig. 14: Device Explorer

5.1 General Settings

- ***Output Period*** – setting for the period of the output signals (default Auto-synchronous mode with the transmitter). This parameter significantly affects the behavior of the servos. For analog servos the reaction (response) accelerates and the power consumption is higher when the values for the output period are lower. This can lead to vibration in some servos if the values are set too low.

For Cental Box 200:

- ***Ext1, Ext3/Pin14, Ext2/Pin15*** – setting of alternative output functions.
  - **JETIBOX** – output for connecting JETIBOX, eventually EX telemetry
  - **Telemetry Input** – input for connecting telemetry sensor
  - **Servo output** – servo output

For Cental Box 100:

- ***Ext1*** – setting of alternative output functions.
  - **JETIBOX** – output for connecting JETIBOX, eventually EX telemetry
  - **Telemetry Input** – input for connecting telemetry sensor
- ***Shutdown voltage*** - input voltage level at which the Central Box automatically turns off. If Central Box measures that the input voltage is lower than the stop level for more than 60 seconds, it automatically turns itself off.

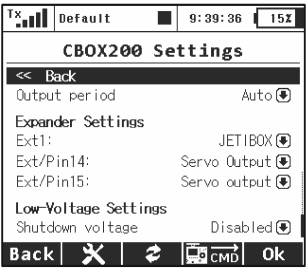


Fig. 15: Device Explorer-General Settings

5.2 Fail-Safe

- ***Fail Safe*** – switches on/off the Fail Safe function. If the Fail Safe function is deactivated, there is no signal generated in any Central Box outputs at the signal loss. If you activate the Fail Safe function, you can also select how the Central Box responds at signal loss for each of the individual outputs (OUT off, hold, fail safe)..
- ***Signal Fault Delay*** – the length of time from when the Central Box detects a signal loss to when the programmed Fail Safe output is performed. During this time the last servo input is held. After the selected time has elapsed, the Central Box outputs behave according to setting for each specific output.
- ***Mode*** - fail-safe mode for specific output of the Central Box
  - *Hold:* repeats the last valid deflection command before signal loss
  - *Out OFF:* does not generate any signal for a servo in case of signal loss
  - *Fail-Safe:* generates pre-set deflection (Value) at the failure with slowdown (Speed)

For easier setup the Fail-Safe deflection can be immediately applied to the Central Box output if the cursor is on the menu item Value and you press the function key **„F4 (Apply)"**.

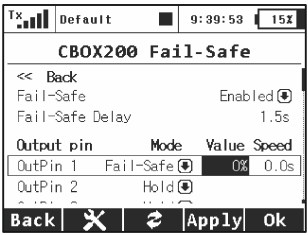


Fig. 16: Device Explorer-Fail Safe

5.3 Servo Output Mapping

- ***Servo No***. – assigning outputs of the transmitter to the Central Box outputs (Output pin).
- ***Group*** – assigns specific output to the group of output impulses that will be generated from the receiver in the same time

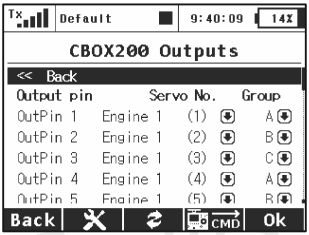


Fig. 17: Device Explorer-Servo Output Mapping

5.4 Telemetry

- ***Temp.*** – actual temperature of the Central Box
- ***Shorted outputs No.*** – actual number of overloaded outputs
- ***Voltage*** – actual voltage of individual outputs of the Central Box
- ***Current*** – actual current drawn from the battery
- ***Capacity*** – capacity taken from the batteries

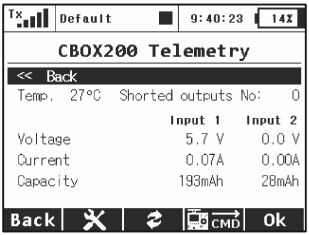


Fig. 18: Device Explorer-Telemetry

5.5 Telemetry Min/Max

- ***Clear Min/Max switch*** – here you can assign a control (switch, stick or knob) on the DC/DS transmitter which clears the recorded battery capacity and minimum/maximum values in the Central Box.
- ***Clear Now*** – allows you to immediately clear the recorded battery capacity and minimum/maximum values in the Central Box.

For description of individual items, see the chapter Minimum/Maximum values

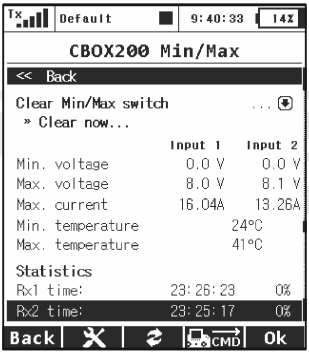


Fig. 19: Device Explorer-Telemetry Min/Max

5.6 Reset to factory settings

- ***Reset to factory settings*** – reset to factory setting of the Central Box

6 Firmware update

Either Central Box allows firmware update via a PC. The update is performed using the JETI **USBa**. The procedure is as shown below:

On the manufacturer/distributor internet pages (***www.jetimodel.com***), under **„Downloads“**, you will find an update program with the most recent firmware. Download it to your PC.

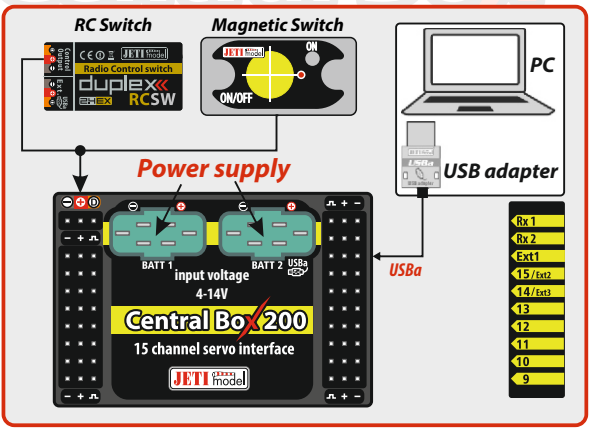
1. Connect the Central Box output labeled Ext1 with the USB adapter by means of interconnection cable.

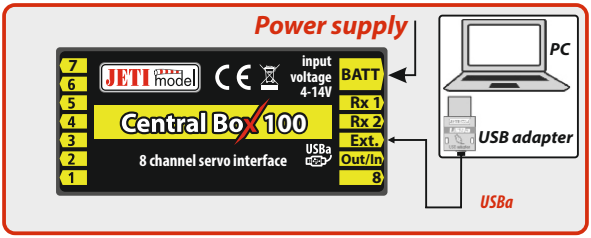
2. Start the firmware update program for the Central Box on your PC.

3. ***For Central Box 100:*** Connect the Central Box to the power supply.

For Central Box 200: Switch on the Central Box using the magnetic switch or the RC switch.

The USB-adapter driver installation instructions can be found in the USB-adapter instruction booklet.





7 Safety precautions for working with magnets

Because the Central Box 200 is put into operation via magnet, it is necessary to follow safety precautions for handling magnets. The magnet is mounted in a hard aluminum carrier.

1. Keep the magnetic key a safe distance from all devices that could be damaged by the magnet, such as TV, credit cards, computers, etc. The magnet may interfere with the function of pacemakers!

2. Keep magnets away from children because of the danger of swallowing or pinching!

8 Technical specifications of the Central Box

Technical specifications of the Central Box 100	
Recommended input voltage	4 – 14 V
Number of connectable accu cells	2-3 LiXX or 4-10 NiXX
Continuous current	10 A
Output pulse current	90 A
Number of servo outputs	up to 8
Operating temperature	- 20°C up to +75°C
Weight	20 g
Dimensions	52x25x11 mm

Technical specifications of the Central Box 200	
Recommended input voltage	4 – 14 V
Number of connectable accu cells	2-3 LiXX or 4-10 NiXX
Continuous current	15 A
Output pulse current	90 A
Number of servo outputs	up to 15
Consumption in the off state with magnetic switch	120uA
Consumption on the off state with the RC switch	140 uA
Operating temperature	- 20°C up to +75°C
Weight	30 g
Dimensions	63x38x17mm
Dimensions of magnetic switch	30x21x5 mm

9 Warranty, service and the technical support

Warranty and service
This product is covered by warranty for 24 months after the day of purchase provided that it has been operated in accordance with these instructions at the specified voltage and is not mechanically damaged. When claiming warranty repairs for the product, always attach a proof of purchase. Warranty and post-warranty service is provided by your dealer or the manufacturer.

Technical support
In case you are not sure about the setup or some functions of the product, do not hesitate to contact our technical support. You can contact either your dealer, or directly the manufacturer ***JETI model s.r.o.***.
For further information see our webpages **www.jetimodel.com.**

We wish you sucessful flying with the products of:
JETI model s.r.o. Příbor, www.jetimodel.com

Declaration of Conformity

Issues name & addres:
JETI model s.r.o.
Lomena 1530, 742 58 Pribor

Object of the declaration:

Products: **Servo interface**
Trade name: **Central Box**

Model: **Central Box 100, 200**
Country of origin: **Czech republic**

The object of declaration described above is in conformity with the requirements of the folowing EU legislations and harmonized standards:
ČSN EN 61000-6-1:2007, ČSN EN 61000-6-3:2007+A1:20011
Electromagnetic compatibility: 6440-454/2008 6440-538/2008

Signed for and on behalf of:

Tomáš Klesnil
production Manager

ENGLISH

Information on Disposal for Users of Waste Electrical & Electronic Equipment (private households)

This symbol on the products and/or accompanying documents means that used electrical and electronic products should not be mixed with general household waste.
For proper treatment, recovery and recycling, please take these products to designated collection points, where they will be accepted on a free of charge basis. Alternatively, in some countries you may be able to return your products to your local retailer upon the purchase of an equivalent new product.
Disposing of this product correctly will help to save valuable resources and prevent any potential negative effects on human health and the environment which could otherwise arise from inappropriate waste handling. Please contact your local authority for further details of your nearest designated collection point.
Penalties may be applicable for incorrect disposal of this waste, in accordance with national legislation.

For business users in the European Union

If you wish to discard electrical and electronic equipment, please contact your dealer or supplier for further information.

Information on Disposal in other Countries outside the European Union

This symbol is only valid in the European Union.
If you wish to discard this product, please contact your local authorities or dealer and ask for the correct method of disposal.

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